

REMARKS

INTRODUCTION

In an Advisory Action mailed September 27, 2006, and during a telephone conference, the Examiner indicated that Applicant's recently filed Amendment After Final Rejection was entered for purposes of appeal. Accordingly, the foregoing status indicators of the claims are relative to the Amendment After Final Rejection.

In accordance with the foregoing, claim 15 has been added. No claims have been cancelled or amended. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1-4 and 6-15 are pending and under consideration. Reconsideration is respectfully requested.

REQUEST FOR INTERVIEW BEFORE OFFICE ACTION

Applicants respectfully request the Examiner contact the undersigned attorney to discuss the pending claims before issuance of an Office Action.

Applicants believe that a more thorough review of the underlying references and the pending claims will be helpful to further prosecution.

REJECTION UNDER 35 U.S.C. §103 OF CLAIMS 1-3

At page 2 of the Office Action, claims 1-3 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,746,896 issued to Shi et al. ("Shi") in view of Admitted Prior Art ("APA"). The rejection is traversed and reconsideration is requested.

Regarding claim 1, the rejection is traversed because the proposed combination of Shi and APA fails to teach or suggest at least:

severing the semiconductor wafer into the plurality of the semiconductor chips.

The Applicants respectfully submit that the outstanding Office Action interpretation is unreasonable in light of the specification.

"The Patent and Trademark Office ('PTO') determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction 'in light of the specification as it would be interpreted by one of ordinary skill in the art.'" *Philips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (citing *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004)); see also *Manual of Patent Examination Procedure* ("MPEP") §2111.

As noted earlier in prosecution, the specification of this application notes that it is an aspect of the present invention to provide a method of surface-mounting a semiconductor chip on a PCB having a simplified process with no need to use a package (such as a chip tray or feeder tape) to transfer a semiconductor chip in the middle of the manufacturing process. See *Specification*, paragraphs [0013] and [0014]. The Specification, in paragraphs [0025]-[0026], also recites:

Subsequently, the wafer 1 is severed into pieces of semiconductor chips 2 at S4. The individual semiconductor chip 2 severed out of the wafer 1 at S4 includes the solder bumps 21 and the partially hardened underfill material 22.

The severed semiconductor chip 2 is disposed on the PCB 4 mounted with electronic components 3. The semiconductor chip 2 and the electronic components 3 may be disposed on the PCB 4 at the same time, or the semiconductor chip 2 may be disposed on the PCB 4 before or after the other electronic components 3, as necessary.

In sharp contrast, Shi teaches dicing or sigulating a WLCFU material coated wafer into individual chips *without damaging the coated WLCFU layer to produce a diced wafer*. *Shi*, col. 5, lines 21-23. Then, the diced wafer of Shi is flipped over and placed on a tacky film that is on carrying film to produce a flipped wafer. *Shi*, Col. 5, lines 23-25. Then, individual chips may be picked, aligned, and placed on a circuit board. *Shi*, Col. 5, lines 29-32. In other words, Shi teaches a process requiring the use of carrying film to transfer the semiconductor chip in the middle of the manufacturing process. Accordingly, the Applicants believe that the Office Action's interpretation of claim 1 is clearly inconsistent with the specification.

The Applicants respectfully submit that at least because neither Shi nor APA teach or suggest all of the features of claim 1, the proposed combination of Shi and APA fails to establish a prima facie case of obviousness. Accordingly, claim 1 is deemed to be allowable over the art of record. Therefore, withdrawal of the §103 rejection is respectfully requested.

The Applicants also respectfully maintain that a valid line of reasoning from the prior art to combine the teachings of Shi and the APA has not been established. Rather, the Office Action states on page 3:

[I]t would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the process of forming the device of Shi by forming a flip chip type semiconductor chip on the PCB mounted with electronic components in order to electronically connect the semiconductor chip to the electronic components, as taught by APA.

The Applicants respectfully submit that the Examiner's Statements amount to a conclusory generalization that does not equate to valid line of reasoning from the prior art to combine the teachings of the references. Rather, at best, this amounts to an improper hindsight reconstruction. Withdrawal of the 103 rejection is respectfully requested.

Regarding the rejection of claims 2 and 3, these claims depend directly or indirectly on independent claim 1, and are therefore believed to be allowable for at least the reasons noted above.

REJECTION UNDER 35 U.S.C. §103 OF CLAIMS 4-14

At page 3 of the Office Action, claims 4-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,746,896 issued to Shi et al. ("Shi") in view of U.S. Patent No. 6,881,607 issued to Farnworth ("Farnworth"). Independent claim 4 has been amended to include the subject matter of herein-cancelled dependent claim 5. The rejection is traversed and reconsideration is requested.

Regarding claim 4, the rejection is traversed because the proposed combination of Shi and Farnworth fails to teach or suggest at least:

curing the underfill material to achieve a semisolid state,
wherein a temperature to cure the underfill material to a semisolid state is lower than a reflow temperature of the solder balls.

Here, it is briefly noted that the Office Action cites Shi for teaching this feature directly after indicating that Shi does not teach this feature. Specifically, the Office Action states regarding herein-cancelled dependent claim 5:

Shi discloses that a temperature to cure the underfill material to a semisolid state is lower than a reflow temperature of the solder balls.

Office Action, pages 4-5, lines 20-1, while two paragraphs earlier, the Office Action states:

Shi does not disclose a step of curing the underfill material to achieve a semisolid state.

Moreover, the Applicants respectfully submit that, contrary to the contentions in the Advisory Action, Farnworth merely mentions a "laser light beam 112 used to cure liquid resin 60 to at least a semisolid state". *Farnworth*, col. 14, lines 43-45. The Applicants respectfully submit that this does not equate to curing the underfill material to a semisolid state.

Regarding claim 11, the rejection is traversed because the proposed combination of Shi and Farnworth fails to teach or suggest:

severing the flip chip type semiconductor wafer into a plurality of flip chip semiconductor chips.

As discussed above, Shi cannot properly be relied upon for teaching or suggesting the severing operation as it is recited. The Applicants respectfully submit that Farnworth fails to make up for this deficiency.

The Applicants respectfully submit that at least because neither Shi nor Farnworth teach or suggest all of the features of claims 4 and 11, the proposed combination of Shi and Farnworth fails to establish a prima facie case of obviousness. Accordingly, claims 4 and 11 are deemed to be allowable over the art of record. Therefore, withdrawal of the §103 rejection is respectfully requested.

The Applicants respectfully maintain that a valid line of reasoning from the prior art to combine the teachings of Shi and Farnworth has not been established. Rather, the Office Action states on pages 4 and 6:

[I]t would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the process of Shi by performing a step of curing the underfill material to achieve a semisolid state because such curing the underfill material would provide a void-free dielectric underfill structure, as taught by Farnworth (col. 5, lines 26-29).

It is unclear how the statement: "The method of the invention provides a substantially void-free dielectric underfill structure which is substantially fully bonded to both the active surface of the semiconductor die..." provides a motivation to combine the teachings of Farnworth with the teachings of Shi. The Applicants respectfully submit that this, at best, amounts to an improper hindsight reconstruction of the invention. Accordingly, withdrawal of the 103 rejection is respectfully requested.

Regarding the rejection of claims 6-10 and 12-14, these claims depend directly or indirectly on one of independent claims 4 and 11, and are therefore believed to be allowable for at least the reasons noted above.

CONCLUSION

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot. And further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

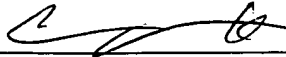
If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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Date: Nov. 6, 2006

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